



Transuranic waste treatment facility built, now faces certification hurdle

Most construction projects end with the final pounding of a hammer, the slam of a door, or a toast to a job well done. But the completion of the Advanced Mixed Waste Treatment Project, or AMWTP, was marked by the scratching of a bureaucrat's pen.

The facility will prepare transuranic waste now buried or stored at the INEEL for shipment to the Waste Isolation Pilot Plant, a permanent geological repository near Carlsbad, New Mexico. Carved out of natural salt deposits deep beneath the earth's surface, WIPP's caverns will hold contaminated material left over from production of nuclear weapons during the Cold War. Over time, the salt will move, like water, to surround and seal the waste.

Although construction is officially complete, the AMWTP will now be subject to a series of inspections. A team of inspectors from the Department of Energy's Carlsbad, New Mexico office, accompanied by several inspectors from the state of New Mexico, will visit the facility to ensure that it can treat waste to meet the Waste Isolation Pilot Plant's rigorous "waste acceptance criteria." The DOE Carlsbad office will prepare the audit report and submit it to the state of New Mexico. Operations and equipment are being checked and double-checked in preparation for the inspections.

The Nuclear Regulatory Commission must be satisfied with the facility's shipping plans, as well as each state along the shipping corridor: Idaho, Wyoming, Utah, Colorado, and New Mexico. Representatives from the Department of Energy's Idaho Operations Office, the state Department of Environmental Quality, and the Idaho State Police are also scrutinizing the facility, the processes that will be used to prepare waste for shipment, and the plans it has made for quality control, safety assurance, and emergency response.

The 1995 Settlement Agreement signed by the state, the Department of Energy, and the Navy spurred the construction of the AMWTP. The Agreement



Sept. 2000: A hole is dug for the AMWTP's foundation. Because they were digging in the Radioactive Waste Management Complex, builders took extra care.



Dec. 2002: AMWTP nears completion. The facility must be certified by the DOE's Carlsbad office and the state of New Mexico. Photos courtesy of BNFL.

*State Oversight
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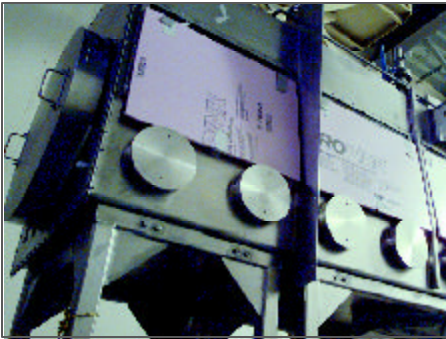
specifically mentions the facility:

“Mixed Waste Treatment Facility. DOE shall, as soon as practicable, commence the procurement of a treatment facility (“Facility”) at INEL for the treatment of mixed waste, transuranic waste and alpha-emitting mixed low-level waste (“Treatable Waste”). DOE shall execute a procurement contract for the Facility by June 1, 1997, complete construction of the Facility by December 31, 2002, and commence operation of the Facility by March 31, 2003.”

“Getting to this point has involved a tremendous effort by many people,” said state INEEL Oversight Chief Kathleen Trever, “but it will all be worth it when waste starts moving through the plant.”



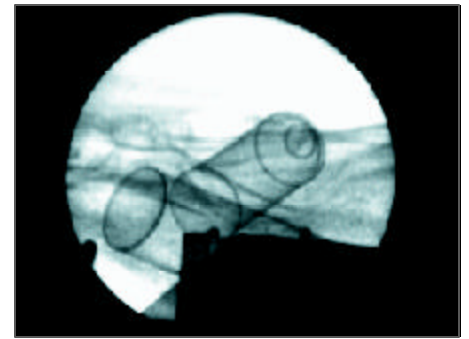
RWMC before the AMWTP. The yellow star was added to show where the AMWTP facility is now located. The white buildings store transuranic waste.



Not your father's glovebox: One of the largest in the country, this glovebox will be used to sort and repack barrels of waste, removing restricted items like compressed gas cylinders or liquids.



Automated carts will move drums through a unit like an x-ray machine. This allows workers to “see” what is in a drum before opening it, which is safer for the workers and the environment.



X-ray vision: not only do we get a sneak peek at the drum's contents, a video record is also made of the contents. These three photos courtesy of BNFL.

Acronym guide

AMWTP: the Advanced Mixed Waste Treatment Project, a waste treatment facility on the INEEL.

BNFL: The contractor that built and will run and own the AMWTP for the Dept. of Energy. BNFL is a private company incorporated in the United States. Its parent company is British Nuclear Fuels plc.

BBWI: Bechtel BWXT Idaho LLC, a contractor that runs the INEEL for the Department of Energy.

DOE: The federal Department of Energy.

DEQ: the state Department of Environmental Quality.

INEEL: the Idaho National Engineering and Environmental Laboratory, a federal nuclear research laboratory in Idaho.

RCRA: The federal Resource Conservation and Recovery Act. The RCRA hazardous waste program allows states to gain federal permission (called “authorization”) to regulate hazardous wastes.

RWMC: Radioactive Waste Management Complex, part of the INEEL. RWMC includes the TSA, or transuranic storage area, and the SDA, or the subsurface disposal area.

TRU: transuranic waste, material contaminated by transuranic elements (man-made elements created in a nuclear reaction). It's sometimes called “nuclear garbage” or “plutonium-contaminated waste.” Plutonium is a transuranic element.

Transuranic waste is shipped in Transuranic Package Transporters, called TRUpact or TRUPACT containers.

WIPP: Waste Isolation Pilot Plant, an underground series of caves in New Mexico. Built in a formation of salt crystals, it's a permanent geologic repository for transuranic waste.

Over time—geologic time, that is—the salt will move like water to encapsulate the waste. Thus the longest-lived radioactive elements will be isolated from people and the environment for the longest possible time.

INEEL's transuranic timeline: 1963 to 2002

December 27, 2002: INEEL meets its Settlement Agreement deadline to complete construction of AMWTP.

October 21, 2002: INEEL meets its Settlement Agreement deadline for shipping 3,100 cubic meters of waste to WIPP. Shipping is put on hold pending completion of the AMWTP.

April 18, 2002: The State asks the federal judge with jurisdiction over the Settlement Agreement to clarify the meaning of the word "all" in the Agreement's requirement to remove "all transuranic waste" from Idaho by 2018. The state contends "all" means all, but DOE insists the Agreement doesn't cover waste buried before 1970.

August 22, 2000: INEEL contractor BNFL starts construction of AMWTP.

March 26, 2000: DOE inks agreement with "Keep Yellowstone Nuclear Free" and other groups who had sued DOE to halt AMWTP construction. These groups had voiced health and environmental concerns with the facility, particularly the incinerator. DOE agrees to put the facility's incinerator on hold and assemble a "Blue Ribbon" Committee to investigate methods other than incineration for treating PCB-contaminated and other waste. The agreement allows the rest of the facility to go forward.



Right: artist's rendition of proposed facility.

September 27, 1999: The state of New Mexico issues a state hazardous waste permit, which allows WIPP to accept mixed transuranic waste. INEEL received certification to send mixed wastes to WIPP on July 17, 2000.

March 26, 1999: WIPP begins accepting wastes after a federal judge rules DOE does not need a state hazardous waste permit to accept wastes that are radioactive but not hazardous. EPA had approved the site for accepting radioactive waste in 1998.

November 20, 1996: DOE contracts with BNFL for the AMWTP. The company will build, operate, and own the facility, although there is a provision in the contract that lets DOE buy the facility.



October 17, 1995: Idaho, DOE, and the Navy settle the State's lawsuit with an agreement that includes deadlines for treating and shipping transuranic waste, high-level waste and spent nuclear fuel. Deadlines are set for executing a contract for a mixed waste treatment facility (June 1, 1997), and completion of construction (Dec. 31, 2002). The first shipment of transuranic waste had to

leave the state by April 30, 1999, 3,100 cubic meters had to leave the state by Dec. 30, 2002, and an average of 2,000 cubic meters must be shipped each year until all transuranic waste is removed, no later than 2018.

1989: Told WIPP shipments from INEEL and other sites would begin soon, state and local emergency responders begin preparations. They'll plan, prepare, and train for ten years before a shipment occurs, and will continue these efforts as long as shipments occur.

1979: Congress authorizes a research and development facility near Carlsbad, New Mexico, the Waste Isolation Pilot Plant, for the disposal of radioactive waste produced by national defense activities. Evaluation of waste disposal efforts date back to 1955. The federal government rejected a potential disposal facility in a Kansas salt formation in 1972 and began looking near Carlsbad in 1974.

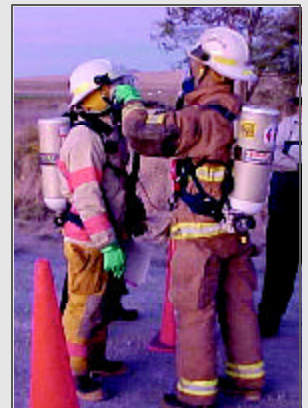
Right: regional response team radiological emergency response drill in Jerome.

1970: Federal officials pledge to Idaho officials that all transuranic waste will be removed "within the decade."



1950s to 1980s: Waste from Rocky Flats nuclear weapons production facility shipped to Idaho for temporary storage. Before 1970, it was placed in unlined pits and trenches. After 1970, waste was placed in "earthen" covered storage, then later in huge tent-like "air support buildings." Record-keeping was not always complete.

Left: waste disposal at the INEEL, before 1970.



Shipment milestone met safely, ahead of schedule

changes in the works as AMWTP gears up for operation

There's still a long, long way to go, but the INEEL has made a good start on removing transuranic waste from Idaho by the 2018 deadline set by Idaho's 1995 court settlement. Workers for INEEL contractor BBWI met a key shipment milestone on Oct. 21 when the equivalent of the 15,000th barrel of transuranic waste from the INEEL arrived at the Waste Isolation Pilot Plant in New Mexico. With this shipment, INEEL met its deadline for removing 3,100 cubic meters of transuranic waste from Idaho by Dec. 31, 2002.



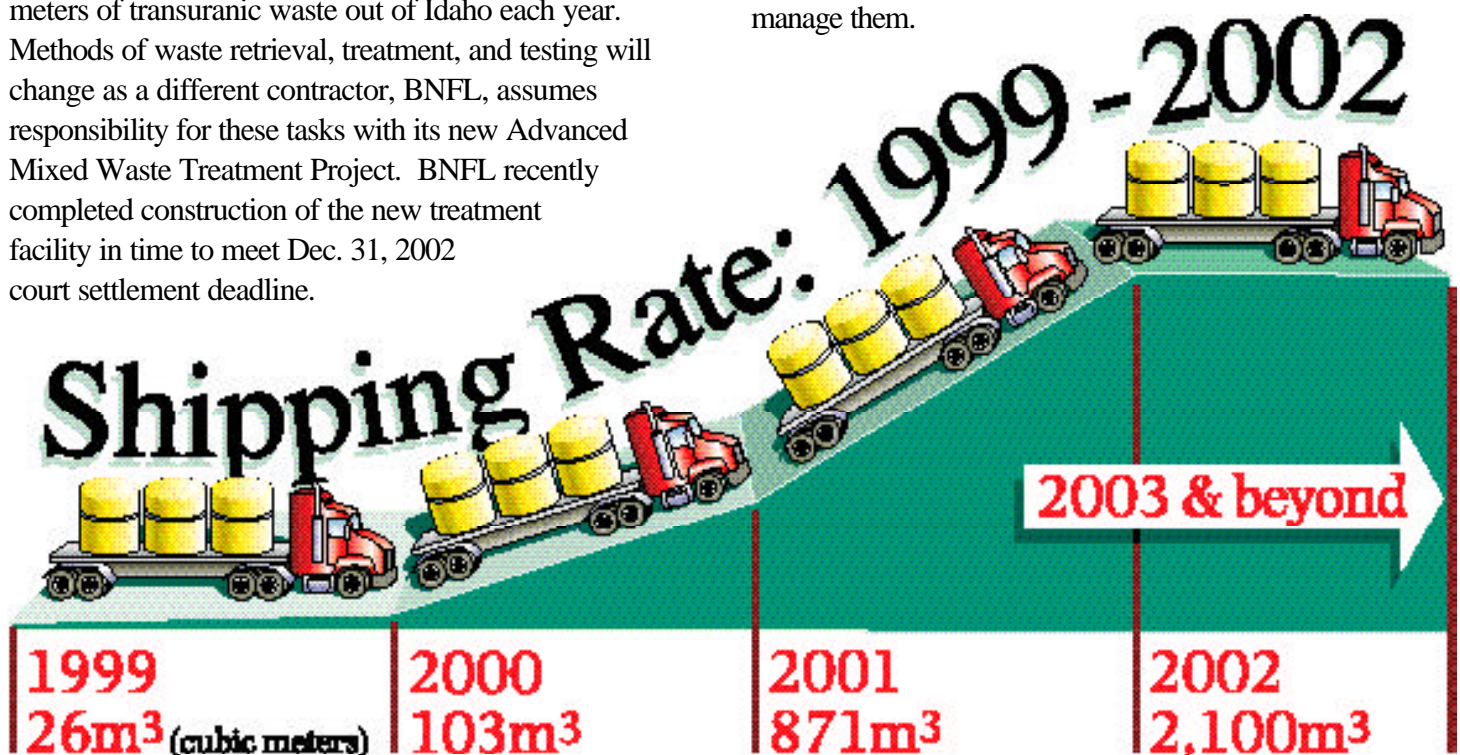
Milestone-meeting shipment

DOE must now ship an average of 2,000 cubic meters of transuranic waste out of Idaho each year. Methods of waste retrieval, treatment, and testing will change as a different contractor, BNFL, assumes responsibility for these tasks with its new Advanced Mixed Waste Treatment Project. BNFL recently completed construction of the new treatment facility in time to meet Dec. 31, 2002 court settlement deadline.

Treating transuranic waste is complex. It comes in many forms, may contain many different contaminants, and may be packaged in many ways. Some, called "mixed waste" is hazardous as well as radioactive.

Workers at the AMWTP will assess, or "characterize" waste to make sure WIPP can accept it and determine whether it needs treatment. BNFL must verify records about the waste's generation and contents and decide how to treat each container of waste based upon what it finds during the waste characterization process. Waste may be repackaged, sized (cut into smaller pieces), supercompacted (squashed to reduce waste volume) or stabilized by adding material to absorb liquids. Most of the waste—about 70%—will be supercompacted. This will save space at WIPP.

DOE decided to put the incinerator planned for the facility on hold, so there is currently no way for some wastes, such as those containing PCBs, to meet disposal or shipping requirements. These wastes will be set aside until DOE decides how to manage them.



The Settlement Agreement requires the INEEL to ship at least 2000 m³ (cubic meters) per year through 2018. All of the transuranic waste at the INEEL must be removed from Idaho by the end of 2018.

Shipping waste to WIPP: a TRU story

As of January, 2003, WIPP has received over 1,400 shipments from several sites, with over 500 from the INEEL. The waste shipping campaign has protected workers, the public and environment, but it has encountered a few problems. The states involved take WIPP shipment safety very seriously. We analyze any irregularity, no matter how insignificant it may appear, so we can learn how to prevent problems and improve our preparations and response.

Two shipments have been involved in highway accidents, both in 2002. One accident occurred in Wyoming when the WIPP truck driver blacked out and left the road before the second driver was able to secure the vehicle (all WIPP trucks have two drivers who take turns to keep drivers alert). There were no injuries and no other vehicles were involved. On-scene inspections performed by Wyoming state police according to WIPP shipment procedures found no release of contamination.

An allegedly drunk driver rear-ended another WIPP truck near Carlsbad. When the shipment arrived at WIPP, one of the shipping containers had internal contamination, but the container system kept contamination from release to the environment. Because WIPP's permit does not allow it to accept transport containers with internal contamination, the container and its contents were returned to INEEL. It will be inspected and repacked for proper disposal. An important lesson was learned: the DOE did not have a plan for managing contaminated shipping containers. Idaho and other states have asked DOE to develop plans for dealing with this type of situation.

The first three shipments to WIPP, which were from Los Alamos in 1999, took an unapproved shortcut on a highway across a federally recognized sacred portion of San Ildefonso Pueblo land. DOE has ensured all subsequent shipments follow designated routes.

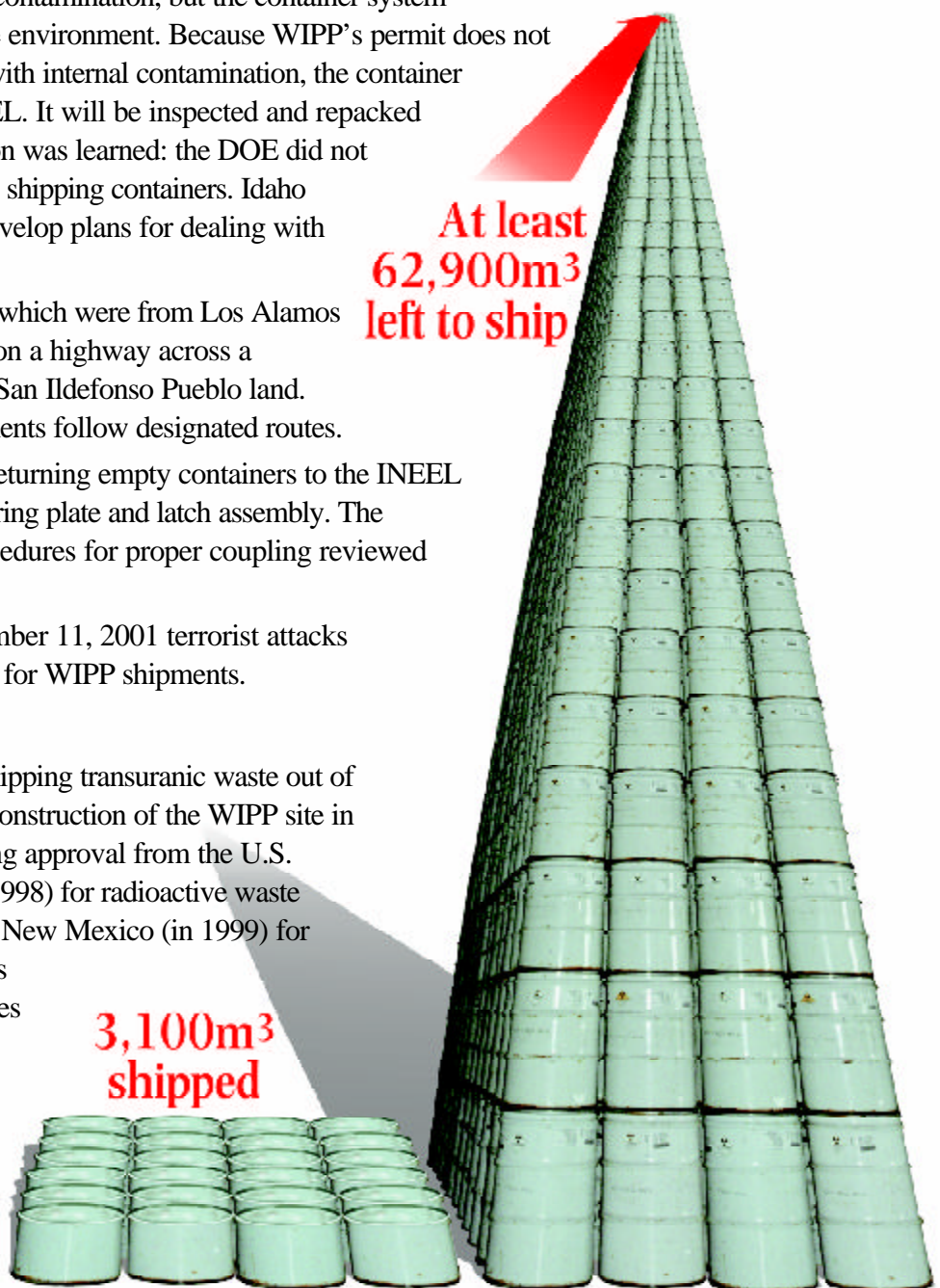
In 2001, one WIPP tractor-trailer returning empty containers to the INEEL arrived with a damaged fifth wheel bearing plate and latch assembly. The damaged parts were replaced and procedures for proper coupling reviewed with all drivers.

The federal response to the September 11, 2001 terrorist attacks involved increased security procedures for WIPP shipments.

Shipping delays

Several things have caused delays in shipping transuranic waste out of Idaho. The first was the selection and construction of the WIPP site in New Mexico. The second was receiving approval from the U.S. Environmental Protection Agency (in 1998) for radioactive waste disposal and a permit from the state of New Mexico (in 1999) for radioactive waste mixed with hazardous (chemical) components. Legal challenges to the selection and approval of the WIPP site have also delayed shipments.

There were 10 months between INEEL's fourth and fifth shipment to WIPP. INEEL had to revise procedures to respond to





Aug. 7, 2002: Four trucks carrying transuranic waste line up, ready to leave the INEEL.

deficiencies detected by an audit of the site and comply with the newly issued New Mexico permit. The federal government halted shipments in response to the September 11 attacks and to increase shipment security.

Several DOE sites are shipping waste to WIPP, and INEEL's shipment rate can be affected as sites compete for a limited number of shipping resources, including shipping casks, drivers, and trailers. The INEEL shipment rate will also slow with the transfer from contractor BBWI to BNFL.

Weather can also temporarily delay shipments. There are procedures to halt shipments, and safely park them if they are en route, if weather like winter storms makes driving too hazardous.

"Our top priority is shipment safety," says Oversight's Craig Halverson, who manages Oversight's emergency response preparations.

Thomas Jefferson said "The price of liberty is eternal vigilance." When it comes to ensuring that the remnants of the Cold War are safely transported and disposed of, that's what we need, and that's what the state and communities affected by these shipments insist on.

Steps taken at the INEEL to satisfy WIPP's Waste Acceptance Criteria

State regulators in New Mexico must approve of the methods INEEL takes to prepare the waste. Here's what the INEEL has to do:

- 1 **Venting and filter installation**—drums of waste brought to the *Drum Vent Facility* are enclosed in an airtight silo. A hole is punched in each drum, and vented gasses are directed to exhaust pipes equipped with HEPA filters. A machine inserts a particulate filter device into the hole to allow pressure venting while simultaneously preventing radioactive material from escaping. This will ensure that hydrogen gas doesn't build up in the container, inside a shipping container, or in one of WIPP's caverns.
- 2 **Headspace gas sampling**—after the filters are installed, a syringe is used to extract a sample of the gas that is analyzed by gas chromatography to determine the constituents.
- 3 **Hydrogen gas evolution**—randomly selected drums are heated for 48 hours, and the amount of evolved hydrogen gas, which is explosive, is measured. (This is a department of transportation requirement for ensuring shipping safety.)
- 4 **Passive active neutron radiography**—is used to view the contents of the drums and provide a video record of exactly what is in each drum.
- 5 **Gamma scan**—provides more information on the drum's radioactive contents.
- 6 **External radiation survey**—measures the radiation level on the outside of the drum (for worker safety).
- 7 **External contamination survey**—measures the contamination level on the outside of the drum.
- 8 **Weight**—each barrel is weighed to ensure shipping weight limits are not exceeded.
- 9 **Loading**—up to 14 drums are placed in a shipping container called TRUPACTs, or "Transuranic Package Transporters." The number of barrels that can be placed in a TRUPACT is limited by weight and total grams of fissile (radioactive) material. After TRUPACTs are loaded and sealed, they are placed on a flatbed trailer that can hold up to three TRUPACTs.
- 10 **Truck inspections**—before leaving the INEEL, the trucks are inspected by INEEL to ensure shipping safety and by the Idaho State Police to check for external radiation or contamination. Two specially certified drivers stay with each truck.
- 11 **Drive away**—After the trucks drive away from the INEEL, they must stop and perform an external truck and trailer inspection every two hours or 100 miles of travel. The location of each truck is tracked until the shipment reaches WIPP.
- 12 **Receipt at WIPP**—When the shipment arrives at the WIPP, additional inspections are performed on the truck, trailer and TRUPACTs. Paperwork is checked, and records are kept to ensure that all transuranic waste is accounted for.

Teamwork gets the job done

Throughout the first 8 months of 2002, many people were speculating that INEEL wouldn't meet the 3,100 m³ shipping deadline. "Hey, I'll admit it, I was one of the pessimists," says Oversight's Rick Denning. Denning is a nuclear programs analyst who spends a lot of time tracking the INEEL's progress on Settlement Agreement deadlines. "Time was tight and there was no margin for error. I was starting to consider how we'd react if the milestone wasn't met."

But Denning didn't have to consider for long. Instead, he stood with other state and INEEL employees as they watched the shipment roll out--two full months before the deadline. "Seldom have I been so glad to be wrong," admits Denning, "That was such a great day, and what they did was a truly impressive accomplishment."

Denning lauded the participation of Idaho State Police officers and Oversight health physicists who perform independent inspections of each shipment before it leaves the site. "There was a lot of pressure on those guys," he says. "As the shipping schedule accelerated, their inspection schedule did too, and they went the extra mile time after time. They'd inspect in the middle of the night, throughout the day, you name it, without skipping a single step or sacrificing quality."

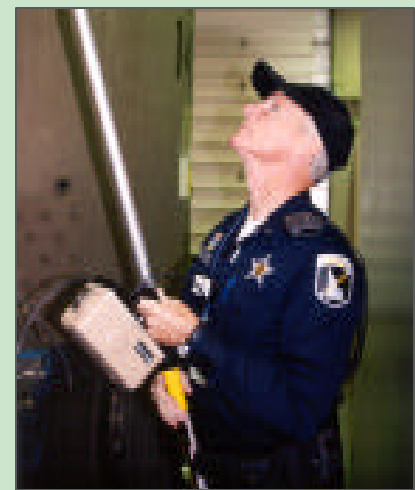
"They're part of our team," said Denning, "And as someone who drives Idaho highways, I'm glad."

ISP officer Sid Edwards admits it's been a challenge. "I'm proud to have been a part of this," Edwards said. "I want you to know we'll continue our vigilance on your behalf." Edwards, who is based in Twin Falls, is one of ISP's specially-trained cadre of hazardous materials response specialists who have added radiological hazards to their responsibilities.

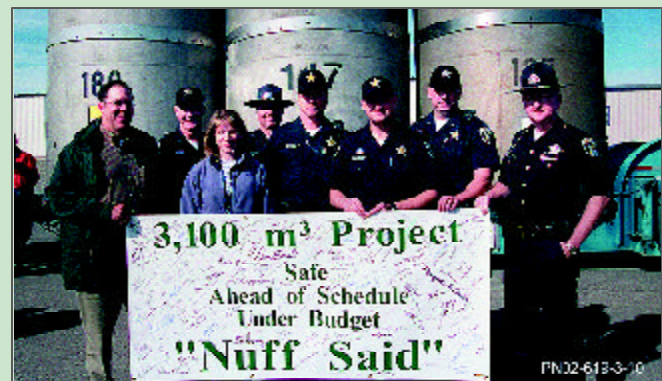
Less seen but equally important are the local emergency responders that have contributed to the effort. "Local emergency responders—fire departments, police departments, sheriffs' offices, regional response teams, local emergency planning committees—are such a key element in this effort," says Edwards. "They have had to learn to deal with a whole new class of hazards, and remain ready to respond in the event anything goes wrong with one of these shipments."



Idaho State Police Officer Sid Edwards uses a hand-held instrument to check a TRUpact container before it leaves the INEEL. Every shipment is inspected, and they may also be randomly checked on the highway.



"This wasn't easy," said Gov. Kempthorne, acknowledging hard work by INEEL employees, BBWI, and DOE. "Given the dedication, technical expertise and teamwork exhibited by everyone involved, I'm optimistic that the challenges still facing us can be met."



Idaho State Police officers and Dept. of Environmental Quality staff were also involved in setting, and meeting, this deadline. The INEEL asked some of them to be on hand to see the historic shipment leave the site, and share in site workers celebration. These two photos courtesy of the INEEL.

INEEL Oversight News & Notes

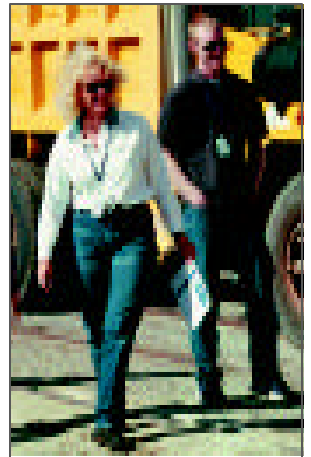
Oversight welcomes two new staff members: Lezlie Aller and John Macklin.

Lezlie Aller, Idaho Falls Office Manager: Former director of the Idaho Emergency Response Commission (now the Hazardous Materials Bureau) Lezlie brings strong relationships with local emergency responders and planning committees. This helps Oversight work with state and local emergency responders as we plan, prepare, and practice response to radiological hazards.

"I'm so glad to be working with this great group of people," says Lezlie, an avid horsewoman, cross-country skier, and hiker, "Oversight is a great place to work because our mission is so clear and every single day I see how we help make Idaho a better place."

John Macklin, Health Physicist: John works with air and radiation monitoring; collecting samples, maintaining equipment, and ensuring consistency in sampling and handling of samples. John is completing his Master's Degree in Health Physics at Idaho State University.

John has also worked for Idaho State University analyzing samples that had been collected by Stoller Environmental, a company that also monitors INEEL's affects on Idaho's environment. "My first months at Oversight have given me a whole new appreciation for the way the monitoring programs complement each other" says John, "As a professional, it keeps me challenged. As a citizen, it makes me feel more confident about our community's safety."



Lezlie Aller and John Macklin at Test Area North.



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